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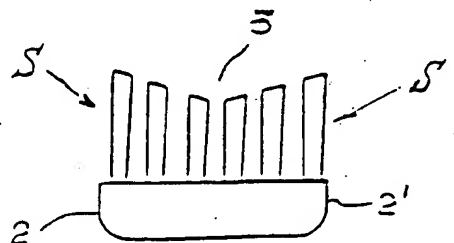
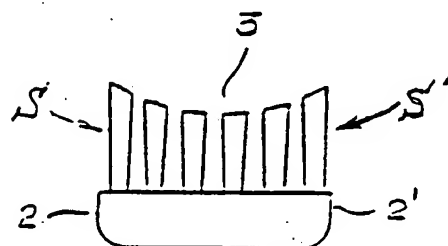
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**AT BE CH DE DK ES FR GB GR IE IT LI LU MC  
NL PT SE**(71) Applicant: **AVANTGARDE S.p.A.**  
**4 Via Treviso**  
**I-00040 Pomezia(Rome) (IT)**(72) Inventor: **Cavazza, Paolo**  
**Viale dell'Umanesimo, 178**  
**I-00144 Roma (IT)**(74) Representative: **Fassi, Aldo**  
**c/o CON LOR S.r.l.,**  
**Via Renato Fucini, 14**  
**D-20133 Milano (IT)**(54) **Toothbrush.**

(57) Toothbrush in which the height of the bristles, present on its head, decreases progressively, from its lateral edges (2,2') towards the longitudinal axis, with the result that the free tips of the bristles form an elongated hollow (3), which runs parallel to the longitudinal axis of the head.

*Fig 3**Fig 4*

The present invention relates to a toothbrush the structure of which is conceived in such a way as to produce a thorough cleaning and massaging action on the gingival structures in addition to the customary cleaning of the interdental spaces.

The results of recent studies indicate that the main problem in adults is not so much tooth decay as a deterioration of the gum tissue, particularly the gingival margin and the alveolar gum. With advancing age the gums tend to retract, with consequent greater exposure of the crowns and alveolar processes, and the end result of such deterioration may be tooth loss.

For many years the improvements made to the structure of toothbrushes have reflected the greater degree of emphasis placed, in oral hygiene, on the treatment of a population consisting mostly of young people for whom, as mentioned above, the main problem is tooth decay.

With such toothbrushes an attempt has therefore been made to improve the cleaning of the interdental spaces and reach the rearmost molars with greater ease and comfort for the user (particularly if very young), even in subjects with a tight rim of the mouth and cramped vestibular space. This result, however, is often achieved without producing a proper parallel cleaning and massaging of the gums, and even at the expense of an abrasive, irritant action on the gingival tissues, which dissuades the user from insisting on thorough, hygienically correct cleaning.

With the toothbrushes currently in use, the situation is further worsened when it comes to proper cleaning of the rear surface of the dental arch and the corresponding internal gingival areas, since the user is "naturally" inclined to neglect them, confining the cleaning to the brushing of the front surface.

This phenomenon is further aggravated in children, who may experience unpleasant self-provoked retching by prodding the base of the tongue with the plastic part of the toothbrush in an attempt to reach the rear surface of the teeth in the innermost areas of the mouth, and this retching may induce them to neglect the less easily accessible zones of the oral cavity.

These drawbacks are all overcome by the toothbrush of the present invention, which allows not only the cleaning of the interdental spaces, but also a thorough cleaning, profound massaging and consequent reactivation of the circulation of the gum tissues, particularly the gingival margin and the alveolar gum, even in the innermost areas of the mouth without any discomfort to the user, even if extremely young.

Toothbrushes have been available for some time now in which the height of the bristles is not constant, but differentiated in such a way that

cleaning surface defined by the bristle tips takes on a broadly "anatomical" form, i.e. so as to adapt to the mean curvature of the users' dental arches. In particular, there is known to be a toothbrush whose set of bristle bundles presents a rake; in this type of toothbrush, the height of the bristles increases progressively and linearly with the increasing distance from the end of the toothbrush opposite to the handle.

The "raked" toothbrush affords various advantages over traditional toothbrushes. In particular, the rearmost molars can be reached easily, even in subjects with a tight rim of the mouth or cramped vestibular space, achieving, moreover, satisfactory removal of food residues from the gingival pockets and dental plaque with reactivation of the gingival circulation.

It has now been found that all the advantageous results achievable with the "raked" toothbrush can be further improved by a toothbrush with a head, handle and bristle set characterized by the fact that the bristle set consists of two groups of bristles in each of which the height of the bristles decreases progressively from the edge of the brush head towards its longitudinal axis in such a way that the tips of the bristles produce an elongated hollow depression running parallel to the longitudinal axis of the head.

This invention may be better understood from the following detailed description provided purely for indicative purposes with particular reference to the figures in the attached drawings, where:

- figure 1 is a side view of a toothbrush of known type with the bristle tips forming a rake;
- figure 2 is a perspective view of a toothbrush as per the invention;
- figure 3 is the cross section obtained in the middle area of the toothbrush head in its first execution version, and
- figure 4 is also a cross section obtained in the middle area of the toothbrush head according to a different execution version.

Comparison between figure 1, which represents a "raked" toothbrush of known type, and figures 2-4 immediately reveals the difference in arrangement of the bristle sets in the two toothbrush giving rise to different and functionally distinct "raked structures". Whereas in the known toothbrush (fig. 1), the decreasing height of the bristles produces a single raked structure in the longitudinal direction from head to handle, in the toothbrush as per the invention, as can be seen in figure 2 and even more clearly in figures 3 and 4, the height of the bristles decreases gradually from the edges (2,2') of the head towards its longitudinal axis. Two subsets of bristles are thus formed presenting opposite "raked structures" (S,S') which

run transversally in relation to the head-handle axis (not longitudinally as in the known toothbrush) and cooperate to form a hollow (3) which runs parallel to the longitudinal axis of the head (1) of the toothbrush.

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This hollow is completely lacking in the known "raked" toothbrush.

The particular arrangement of the bristles produces the positive effect of achieving simultaneously a delicate massaging of the gums by the longer (and therefore softer) bristles, access in any direction and from any angle to the interdental spaces on the part of the intermediate bristles, and, lastly, a vigorous cleaning action on the dental arches by the shorter (and therefore stiffer) bristles.

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It goes without saying that the specific form of the hollow created by the differentiated lengths of the bristles may differ from the two practical versions currently regarded as preferential and, for this reason, illustrated in the attached drawings, just as the illustrated shape of the toothbrush may be modified according to specific production requirements, without thereby depriving such toothbrushes of the patent protection accorded this invention.

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### Claims

1. Toothbrush comprising a head, handle and bristle set, characterized by the fact that the bristle set comprises two subset of bristles (S,S') in each of which the height of the bristles decreases progressively from the edges (2,2') of the head (1) towards its longitudinal axis, with the result that the tips of the bristles form an elongated hollow (3), which runs parallel to the longitudinal axis of the head.
2. The toothbrush of claim 1, characterized by the fact that the hollow (3) is rounded.
3. The toothbrush of claim 1, characterized by the fact that the hollow (3) is flat sided.
4. The toothbrush of the foregoing claims, characterized by the above descriptions and illustrations.

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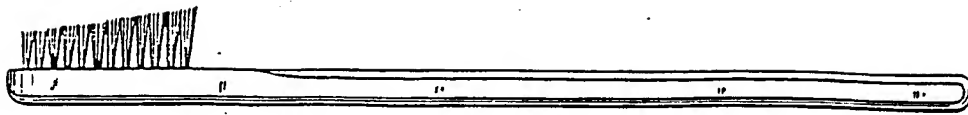


Fig. 1

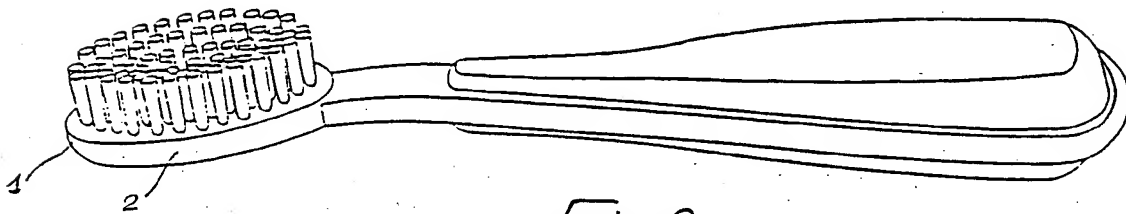


Fig. 2

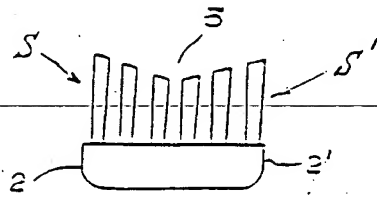


Fig 3

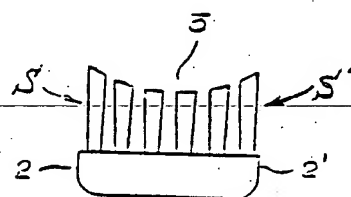


Fig 4



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## EUROPEAN SEARCH REPORT

Application Number  
EP 94 11 7993

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US-A-4 894 880 (AZNAVOORIAN) * the whole document *	1, 3, 4	A46B9/04
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P, X	WO-A-94 13174 (SCHEIER) * the whole document *	1, 3, 4	
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P, X	WO-A-94 09678 (CANADA INC.) * the whole document *	1-4	
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P, A	FR-A-2 700 678 (ART VISION) * the whole document *	1, 2, 4	
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A	EP-A-0 130 252 (ERNEST) * the whole document *	1-4	
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A	US-A-4 882 803 (ROGERS ET AL.) * the whole document *	1, 2, 4	
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			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			A46B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 8 March 1995	Examiner Von Arx, H
<b>CATEGORY OF CITED DOCUMENTS</b>			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document	

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